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Public Health Assessment for

PFIZER, INCORPORATED
EAST ST. LOUIS, ST. CLAIR COUNTY, ILLINOIS
EPA FACILITY ID: ILD006317119
MARCH 20, 2001

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
Agency for Toxic Substances and Disease Registry



PUBLIC HEALTH ASSESSMENT

PFIZER, INCORPORATED

EAST ST. LOUIS, ST. CLAIR COUNTY, ILLINOIS

EPA FACILITY ID: ILD006317119

Prepared by:

Illinois Department of Public Health
Under Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

THE ATSDR PUBLIC HEALTH ASSESSMENT: A NOTE OF EXPLANATION

This Public Health Assessment was prepared by ATSDR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) section 104 (i)(6) (42 U.S.C. 9604 (i)(6)), and in accordance with our implementing regulations (42 C.F.R. Part 90). In preparing this document, ATSDR has collected relevant health data, environmental data, and community health concerns from the Environmental Protection Agency (EPA), state and local health and environmental agencies, the community, and potentially responsible parties, where appropriate.

In addition, this document has previously been provided to EPA and the affected states in an initial release, as required by CERCLA section 104 (i)(6)(H) for their information and review. The revised document was released for a 30-day public comment period. Subsequent to the public comment period, ATSDR addressed all public comments and revised or appended the document as appropriate. The public health assessment has now been reissued. This concludes the public health assessment process for this site, unless additional information is obtained by ATSDR which, in the agency's opinion, indicates a need to revise or append the conclusions previously issued.

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FOREWORD

The Agency for Toxic Substances and Disease Registry, ATSDR, was established by Congress in 1980 under the Comprehensive Environmental Response, Compensation, and Liability Act, also known as the *Superfund* law. This law set up a fund to identify and clean up our country's hazardous waste sites. The Environmental Protection Agency, EPA, and the individual states regulate the investigation and clean up of the sites.

Since 1986, ATSDR has been required by law to conduct a public health assessment at each of the sites on the EPA National Priorities List. The aim of these evaluations is to find out if people are being exposed to hazardous substances and, if so, whether that exposure is harmful and should be stopped or reduced. If appropriate, ATSDR also conducts public health assessments when petitioned by concerned individuals. Public health assessments are carried out by environmental and health scientists from ATSDR and from the states with which ATSDR has cooperative agreements. The public health assessment program allows the scientists flexibility in the format or structure of their response to the public health issues at hazardous waste sites. For example, a public health assessment could be one document or it could be a compilation of several health consultations the structure may vary from site to site. Nevertheless, the public health assessment process is not considered complete until the public health issues at the site are addressed.

Exposure: As the first step in the evaluation, ATSDR scientists review environmental data to see how much contamination is at a site, where it is, and how people might come into contact with it. Generally, ATSDR does not collect its own environmental sampling data but reviews information provided by EPA, other government agencies, businesses, and the public. When there is not enough environmental information available, the report will indicate what further sampling data is needed.

Health Effects: If the review of the environmental data shows that people have or could come into contact with hazardous substances, ATSDR scientists evaluate whether or not these contacts may result in harmful effects. ATSDR recognizes that children, because of their play activities and their growing bodies, may be more vulnerable to these effects. As a policy, unless data are available to suggest otherwise, ATSDR considers children to be more sensitive and vulnerable to hazardous substances. Thus, the health impact to the children is considered first when evaluating the health threat to a community. The health impacts to other high risk groups within the community (such as the elderly, chronically ill, and people engaging in high risk practices) also receive special attention during the evaluation.

ATSDR uses existing scientific information, which can include the results of medical, toxicologic and epidemiologic studies and the data collected in disease registries, to determine the health effects that may result from exposures. The science of environmental health is still developing, and sometimes scientific information on the health effects of certain substances is not available. When this is so, the report will suggest what further public health actions are needed.

Conclusions: The report presents conclusions about the public health threat, if any, posed by a site. When health threats have been determined for high risk groups (such as children, elderly, chronically ill, and people engaging in high risk practices), they will be summarized in the conclusion section of the report. Ways to stop or reduce exposure will then be recommended in the public health action plan.

ATSDR is primarily an advisory agency, so usually these reports identify what actions are appropriate to be undertaken by EPA, other responsible parties, or the research or education divisions of ATSDR. However, if there is an urgent health threat, ATSDR can issue a public health advisory warning people of the danger. ATSDR can also authorize health education or pilot studies of health effects, fullscale epidemiology studies, disease registries, surveillance studies or research on specific hazardous substances.

Community: ATSDR also needs to learn what people in the area know about the site and what concerns they may have about its impact on their health. Consequently, throughout the evaluation process, ATSDR actively gathers information and comments from the people who live or work near a site, including residents of the area, civic leaders, health professionals and community groups. To ensure that the report responds to the community's health concerns, an early version is also distributed to the public for their comments. All the comments received from the public are responded to in the final version of the report.

Comments: If, after reading this report, you have questions or comments, we encourage you to send them to us.

Letters should be addressed as follows:

Attention: Chief, Program Evaluation, Records, and Information Services Branch, Agency for Toxic Substances and Disease Registry, 1600 Clifton Road (E56), Atlanta, GA 30333.

Pfizer, Inc.

Final Release

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SUMMARY

Residents in the neighborhood near the Pfizer site in East St. Louis, St. Clair County, Illinois, requested that the Illinois Department of Public Health (IDPH) conduct a public health assessment of the site. Residents are concerned that they are being exposed to site-related contaminants from the air and soil. From reviewing available data, IDPH concludes that the Pfizer site does not pose a public health hazard. Because of the lack of air monitoring data, the air pathway poses an indeterminant public health hazard.

The main health issue of concern to area residents is off-site exposure to airborne contaminants from the site. Dust is currently released and has also been released in the past. The most notable release is red, iron oxide pigment, and soils surrounding the site have a reddish stain. The pigment settles on homes and cars and is reportedly difficult to clean from these surfaces. Another concern of area residents is exposure to contaminants in the soil.

The chemicals of interest from the site are arsenic, barium, cadmium, and polycyclic aromatic hydrocarbons. IDPH estimated exposure to soil contaminants for workers on the site and for children and adults off the site. Those soil exposure estimates suggest that no adverse health effects would be expected.

Additional data should be collected to more fully characterize exposure to dust in air. IDPH will contact the IEPA Bureau of Air to determine if ambient air monitoring can be conducted in this area. If so, IDPH will approach the community for assistance in conducting air monitoring in the Summer or Fall of 2001.

PURPOSE AND HEALTH ISSUES

Citizens in the neighborhood near Pfizer, Inc., requested that the Illinois Department of Public Health (IDPH) conduct a health assessment to determine whether the site poses a health hazard to nearby residents. A public meeting was held in October 1998 to receive comments and citizens' concerns regarding the site. In addition, volunteers went door-to-door gathering information from area residents concerning Pfizer.

The primary health issue is off-site exposure to contaminants in the air that migrate from the site. The most notable release is red, iron oxide pigment. Airborne pigment has been noted and raises concerns regarding inhalation exposures to the dust, particularly in the past. The soils surrounding the site have a reddish stain. The pigment settles on homes and cars and is reportedly difficult to clean from these surfaces. Secondary concerns include dermal contact with dust and contaminated surfaces, and ingestion of soil and vegetables grown in local soils.

BACKGROUND

Site History and Location

Pfizer, Inc., began manufacturing pigments at 2001 Lynch Avenue, East St. Louis, St. Clair County, Illinois in 1941. The site has changed ownership twice since 1941 and has been Elementis Pigment, Inc. since January 1, 1998 (1).

The site is on about 40 acres and is bordered by railroad tracks on the north, east, and west, and Lynch Avenue is on the south (Figure 1). A residential area is within 100 feet of the western boundary of the site. The southern, eastern, and northern sections have vacant land directly adjacent to them; however, residential areas are within 500 feet of the northern and eastern site boundaries. A park and baseball fields are south and east of the site. Jefferson Elementary School is about 0.25 miles northeast of the site.

A fence surrounds the site, and guarded gates are in the southwest corner of the site (2). The southern portion of the site is paved and contains buildings. The northwest portion is not paved and contains buildings and waste piles of what appears to be asphalt and construction debris. Iron waste and slag materials have also been observed in this area. Ore and coal piles are known to have been stored in the northern portion of the property (3).

Manufacturing Processes at the Facility

Products manufactured at this facility are inorganic pigments, including red and yellow iron oxides, barium oxide, and magnetic pigments. Substances used on the site and listed in an Illinois Environmental Protection Agency (IEPA) document included ammonia, ferrous chloride, ferrous sulfate, hydrochloric acid, muriatic acid, sodium dichromate, sodium hydroxide, sulfuric acid, barium hydrate, barium hydroxide, and barium peroxide (4).

Primary production at the site is iron oxide pigments. The pigments are produced by placing scrap iron and hydrochloric or sulfuric acid (pickle liquor) into tanks. The pickle liquor is obtained from local steel industries (4). After the acid and iron are heated in tanks for 18 to 24 hours, the solids are removed from the ferrous sulfate or ferrous chloride solutions. The solids are analyzed to determine whether they are hazardous and then are sent to an appropriate landfill. The iron compounds are precipitated out of solution, and the remaining solution is neutralized and discharged to the sanitary sewer (4). The iron oxides produced by this process are then dried, milled, and packed for shipping.

Natural Resource Use

Surface water from the site drains into the sanitary sewer or is discharged to Schoenberger Creek. Surface water runoff from the paved portion of the facility is discharged to the sanitary sewers in

either southwestern or southeastern corners of the property. Surface water runoff from the north and east portion of the property collects in a low area known as Pickens Pond, which is on the east side of the property. Wastewater and sludge from the on-site wastewater treatment plant are also discharged to Pickens Pond. Release of water from the northern section of the property to Schoenberger Creek is permitted through the storm sewer. Water released into the creek from this pipe has been observed to be orange, suggesting the presence of iron oxide.

Groundwater, provided by three on-site wells, is used as non-contact cooling water at the facility (5). This water is then pumped to a discharge point on the east side of the property (1). This water is eventually discharged to Schoenberger Creek via the underground discharge pipe.

Environmental Sampling

Environmental samples were collected on December 2 and 3, 1997, as part of the IEPA Site Team Evaluation Prioritization inspection. Soil, sediment, surface water, and groundwater samples have been collected for the site (Figure 2). Six on-site soil samples and three off-site soil samples were collected from the surface to a depth of eight inches. One off-site soil sample, X101, was collected as a background sample. Two sediment samples were collected from Schoenberger Creek, one upstream and one downstream of the discharge from Pfizer. Three groundwater samples were collected from two on-site locations. Three surface-water samples were collected, one from the site from Pickens Pond and two from Schoenberger Creek off the site. Creek water samples were collected from the same locations as sediment samples. Samples collected by IEPA were analyzed for chemicals listed by the U.S. Environmental Protection Agency (USEPA) as target compounds at hazardous waste sites.

Forty soil samples were collected by IDPH in September 1999. The samples were collected from the surface to a depth of one inch from residential yards and vacant lots to the east, north, and west of the plant. The sampling area was bounded by Lynch Avenue to the south, 23rd Street to the east, Lincoln Avenue to the north, and 15th Street to the west. The soil samples were analyzed for arsenic, barium, cadmium, iron, and lead.

An additional twenty samples were collected in and around the Emerson Park neighborhood for the St. Louis Community Environmental Justice Project (6). The soil samples were collected by Integrity Engineering of Rolla, Missouri (7). Samples were collected from the top one inch of soil in residential yards. These soil samples were analyzed for barium, chromium, cobalt, iron, lead, and zinc.

No air samples are known to have been collected near the Pfizer facility. IEPA has an air-monitoring station in East St. Louis, but not within one-half mile of the site. In 1994 and 1995, IDPH collected air samples from five locations in East St. Louis, but none of these locations was within one mile of Pfizer.

Site Visit

IDPH has visited the site on several occasions, most recently on November 27, 2000. Conditions at the facility remain as described earlier. A fence surrounding the site and guarded gates in the southwest corner of the site ensure that access is limited.

DISCUSSION

Contaminants of Interest

IDPH compared the results of each soil sample with the appropriate screening comparison value used to select contaminants for further evaluation for carcinogenic and non-carcinogenic health effects. Chemicals found at levels greater than comparison values or those for which no comparison values exist were selected for further evaluation (Table 1). A discussion of each comparison value used is found in Attachment 1.

The chemicals of interest at Pfizer are arsenic, barium, cadmium, iron, and polycyclic aromatic hydrocarbons (PAHs). Exposure to a chemical at a level that exceeds a comparison value does not necessarily mean that adverse health effects will result. The potential for exposed persons to experience adverse health effects depends on:

- ▶ how much of each chemical a person is exposed to,
- ▶ how long a person is exposed, and
- ▶ the health condition of the exposed person.

IDPH recognizes that the number of soil samples collected on the site is limited. Other site-related chemicals detected in on-site soil samples may warrant further investigation. Table 2 contains the inorganic chemicals of interest in off-soils from residential yards and vacant lots near Pfizer. The location of the sediment sample is so far removed from the site that contents of the sample may represent contamination from other sources.

Exposure Pathways

People can only be affected by a chemical if they contact it through an exposure pathway at a sufficient concentration to cause a toxic effect. This requires a source of exposure, an environmental transport medium, a point of exposure, a route of exposure, and a receptor population. A pathway is complete if all of its components are present and if people were exposed in the past, are currently exposed, or will be exposed in the future. If parts of a pathway are absent, data are insufficient to decide whether it is complete, or exposure may occur at some time (past, present, future), then it is a potential pathway. If part of a pathway is not present and will never exist, the pathway is incomplete and can be eliminated from further consideration.

The completed exposure pathways for this site are shown in Table 3. Completed exposure pathways for the site-related chemicals include on-site and off-site surface soil, off-site sediments, ambient air, and the waste piles. Potential exposure pathways are shown in Table 4.

Groundwater samples showed iron levels were greater than the USEPA secondary drinking water standard of 0.3 milligrams per liter. Secondary standards are non-enforceable guidelines for chemicals that may cause staining or affect taste. The four groundwater wells on the site are used strictly for non-contact cooling water. Residents of East St. Louis use municipal water.

A possible source of exposure to contaminants is at or near the discharge of the storm sewer into Schoenberger Creek. The levels of iron and manganese are elevated at the discharge points, but consumption of creek water is highly unlikely. The creek is in an area that has few residents and is not readily accessible. Surface water on the site was not evaluated because the site is fenced and a guard is posted at the gate. Workers would not be likely to contact the on-site surface water.

Toxicological Evaluation

Children are a sensitive sub-population, so special consideration is given to potential exposures to children in our toxicological evaluation. To estimate exposure, IDPH assumed that children and adults off the site and workers on the site could be exposed to chemicals of interest. IDPH assumed that residents could be exposed to the highest levels of chemicals of interest in off-site surface soil and sediments 10 months per year by ingestion, dermal contact, and inhalation. Workers could be exposed to chemicals on the site 5 days per week, 50 weeks per year.

The estimated exposure doses were compared with health guidelines for non-cancer health effects. Cancer risks were estimated for those chemicals that are known or suspected carcinogens. The cancer risk for the PAHs was calculated by converting each of the suspected carcinogenic PAHs to their equivalent concentration of benzo(a)pyrene. These equivalents were then added together and used to estimate health risks for exposure to PAHs.

From these scenarios, IDPH found no non-cancer health hazards and no apparent increased cancer risk due to exposure to on-site and off-site contamination. The soils on and off the site have been visibly contaminated with iron oxide pigments from Pfizer, but the iron itself is not a health hazard.

IDPH did not evaluate exposure to airborne dust because of a lack of sampling data. The primary hazard for exposure to dust relates to the size and concentration of respirable particles. Additional data need to be collected to determine the concentration of dust in the air.

COMMUNITY HEALTH CONCERNS

Area residents petitioned this public health assessment because of their concern about exposure to site-related chemicals. IDPH attended a public meeting held October 14, 1998, by Project Hope and the University of Missouri St. Louis Environmental Justice Initiative to explain the health assessment process and to obtain public health concerns about the site. Additional community health concerns were collected by volunteers. About 40 persons voiced their concerns regarding environmental contamination in the neighborhoods surrounding Pfizer. Some concerns included issues that were not related to Pfizer, such as drinking water.

Another meeting was held on November 27, 2000, by Project Hope and the University of Missouri St. Louis Environmental Justice Initiative to report their findings including the results of the twenty soil samples collected in the Emerson Park area. An IDPH representative was available to answer health-related questions at the meeting. Approximately 25 residents attended this meeting. The health concerns voiced at this meeting were similar to those voiced at the October 1998 meeting.

Community health concerns identified from the public meetings and written comments received after the meetings included:

- 1) The airborne dust settles out of the air onto cars and into our houses. Is exposure to airborne dust a health hazard?

The red dust that is in the air is from iron oxide pigments produced at the plant. Dust of this composition or chemical makeup is not toxic through inhalation. The health effects associated with breathing the dust would most likely be the same as those for breathing other dust particles of similar size and would depend on how small the particles are and how deep they are taken into the lung. Currently, neither the amount of dust in the air nor its particle size is known.

- 2) We smell odors coming from the site. Are these harmful to my health?

IDPH does not know the source of the odors coming from the site. At one time, coal-fired boilers produced smoke and presumably odors. These were replaced with natural gas-fired boilers, which would not be expected to produce noticeable odors.

- 3) The soil around the site is red. Aren't we being exposed to these contaminants in soil?

The soil surrounding the site is contaminated with iron oxide pigments from years of operations at Pfizer. The iron levels in the soil on and off the site are greater than background levels. No health guidelines exist for iron in soil, but our bodies require a certain amount of iron to remain healthy. The soil near the site also contains lower levels

of inorganic chemicals such as barium, cadmium, and arsenic. The off-site soil samples collected by IDPH and Integrity Engineering indicate that the levels of inorganic chemicals in the soil do not represent a health hazard to residents.

- 4) Are vegetables from my garden safe to eat?

Eating vegetables grown in soil near the Pfizer plant is not expected to cause adverse health effects. Deposition of the red dust, iron oxide, on leafy vegetables would not pose a health risk. IDPH routinely recommends that all garden produce be washed before consumption.

- 5) The drinking water sometimes has an odor to it. Is it safe to drink?

The source of the odors in the drinking water is not known. All area residents use the municipal water supply for East St. Louis. Public water supplies are required to monitor for specific contaminants. If the water contained contamination at levels above standards, the water company would have to let you know. The municipal water company should be contacted regarding odor, taste, and discoloration problems with the drinking water.

CHILD HEALTH INITIATIVE

IDPH recognizes that children are especially sensitive to some contaminants. For this reason, IDPH included children when evaluating exposures to contaminants near the Pfizer facility. Children are the most sensitive population considered in this health assessment; however, children are not currently being exposed to chemicals from the site at sufficient levels to cause adverse health effects.

CONCLUSIONS

IDPH concludes that the Pfizer, Inc., site in East St. Louis, Illinois, poses no apparent public health hazard for exposure to area soil. This conclusion is based on the fact that estimated exposure to the highest levels of contaminants detected during environmental sampling would not cause adverse health effects. Workers and residents living in neighborhoods adjacent to the site are being exposed to airborne particulates from the site, but no air data exist to evaluate the exposure. Because of the lack of air monitoring data, the air pathway poses an indeterminant public health hazard.

RECOMMENDATIONS AND PUBLIC HEALTH ACTIONS

IDPH recommends that the composition and particle size of the airborne dust be measured in neighborhoods near Pfizer. IDPH will contact the IEPA Bureau of Air to determine if ambient air monitoring can be conducted in this area. If so, IDPH will approach the community for assistance in conducting air monitoring in the Summer or Fall of 2001. Residents should contact the IEPA Bureau of Air to report odors coming from Pfizer.

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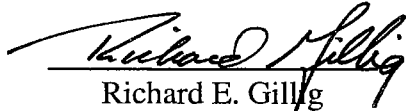
This Pfizer, Inc. Public Health Assessment was prepared by the Illinois Department of Public Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the public health assessment was begun.



for Gail D. Godfrey
Technical Project Officer

Superfund Site Assessment Branch (SSAB)
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.



Richard E. Gillig
Chief, SPS, SSAB, DHAC, ATSDR

REFERENCES

- 1) Letter from Roger Rader, Harcross Pigments, to IEPA. December 22, 1997
- 2) Letter from Roger Rader, Pfizer Plant Manager, to Larry Estep, IEPA. August 5, 1987.
- 3) IEPA. Draft: April 1998 Site Team Evaluation Prioritization Report. 1999.
- 4) IEPA. Preliminary Site Assessment for Pfizer Chemical. 1984.
- 5) Hazardous Waste Permit Application, Pfizer Chemical. 1981.
- 6) St. Louis Community Environmental Justice Project, Handbook for Emmerson Park Area. Prepared by the Public Policy Research Center University of Missouri-St. Louis. March 20, 2000.
- 7) Final Report for University of Missouri - St. Louis and Project Hope, St. Louis, Missouri. Integrity Engineering, Inc. March 2000.
- 8) Conversation with Jerome King, USEPA, Gateway Coordinator, October, 14, 1998.
- 9) Agency for Toxic Substances and Disease Registry. Public Health Assessment Guidance Manual. Atlanta, Ga., 1992.
- 10) Agency for Toxic Substances and Disease Registry. Toxicological Profile for Arsenic (Draft). Atlanta, Ga., 1991
- 11) Agency for Toxic Substances and Disease Registry. Toxicological Profile for Barium. Atlanta, Ga., 1992.
- 12) Agency for Toxic Substances and Disease Registry. Toxicological Profile for Cadmium (Draft). Atlanta, Ga., 1991.
- 13) Agency for Toxic Substances and Disease Registry. Toxicological Profile for PAHs. Atlanta, Ga., 1995.

FIGURES

Approximate Location of Pfizer, Inc.

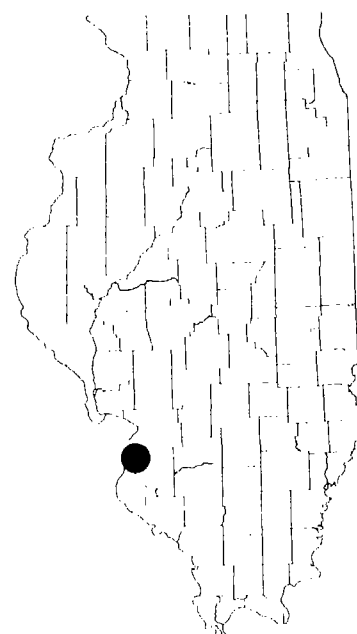
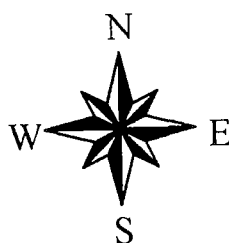
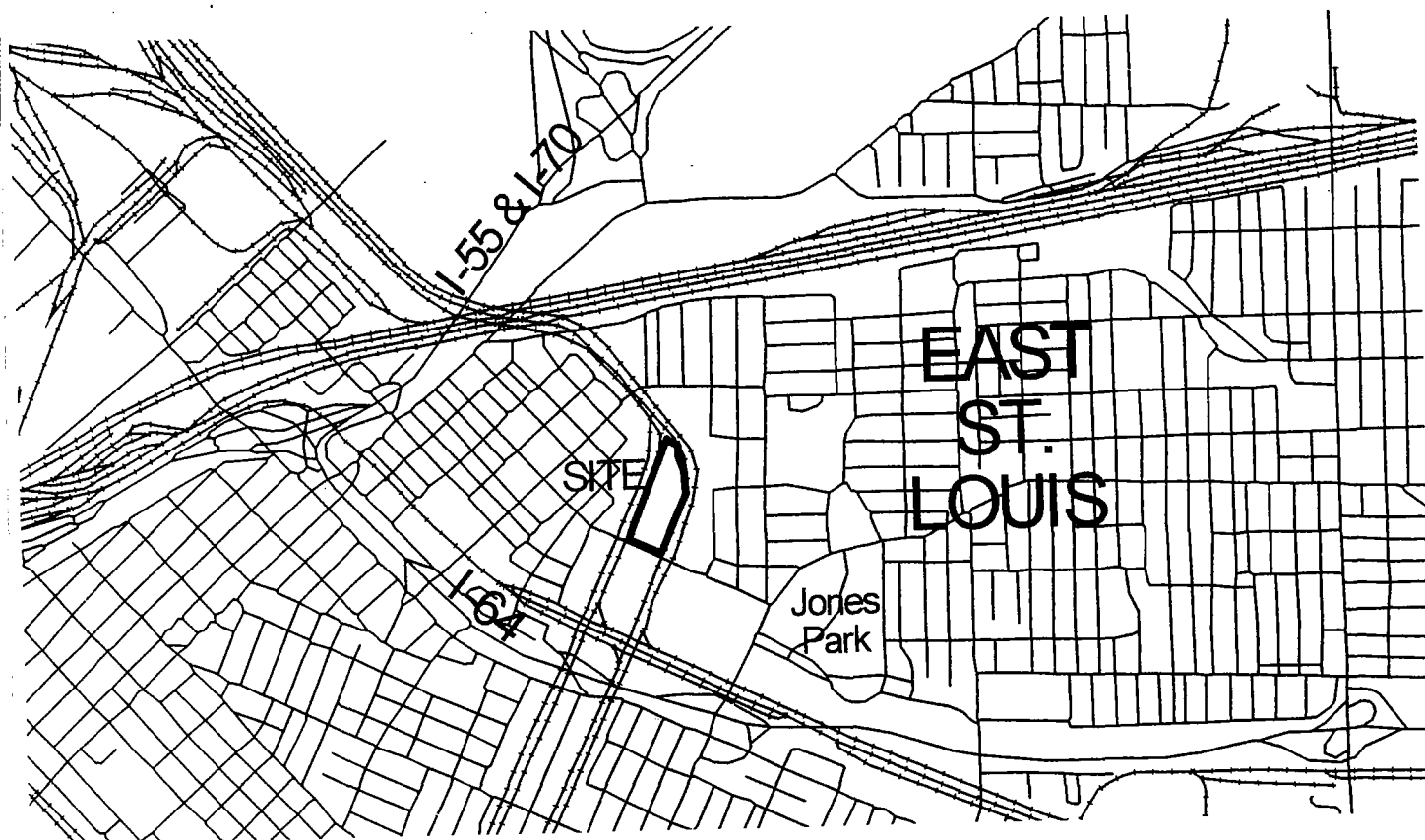
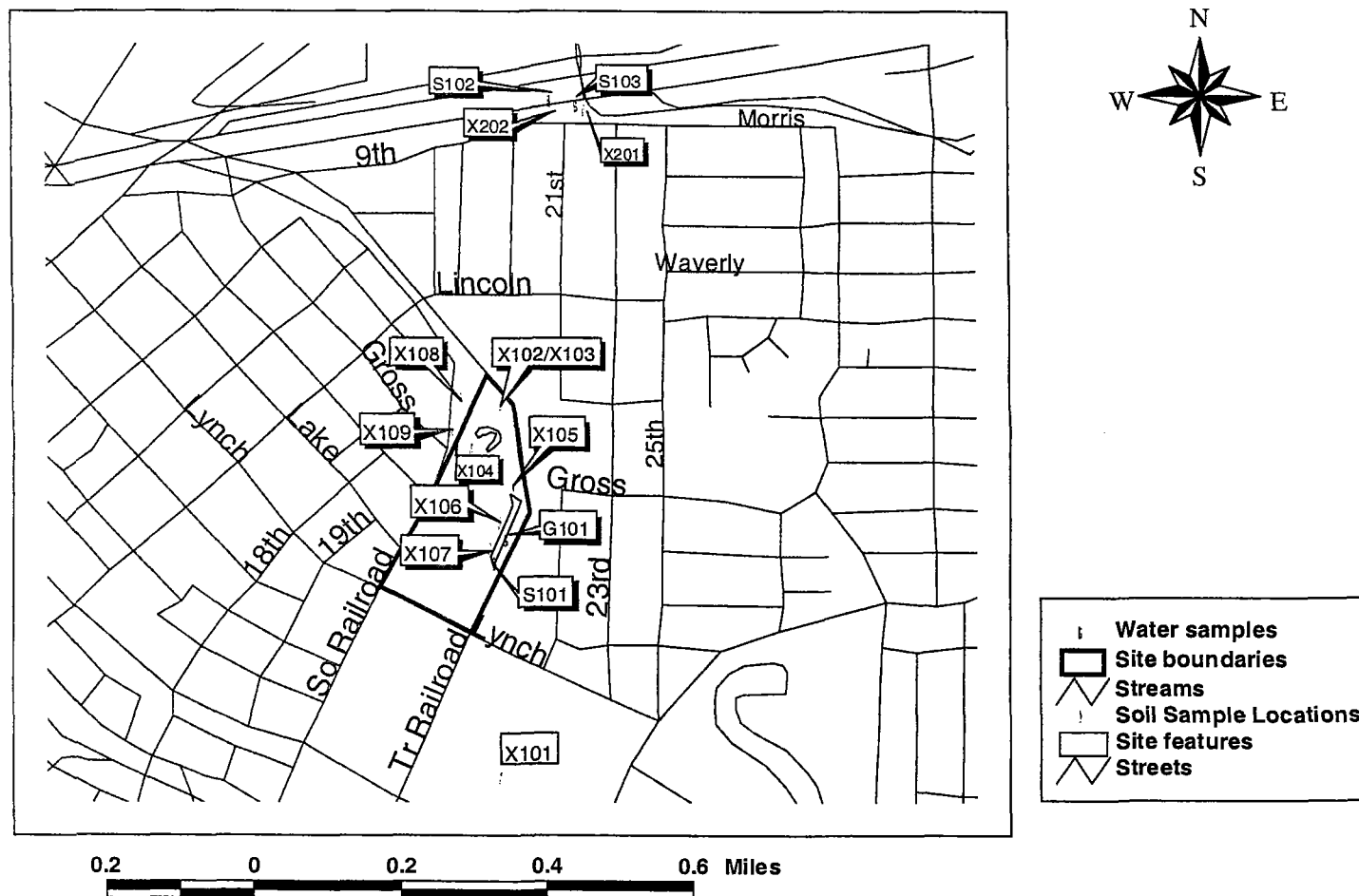


FIGURE 2

Sample Location Map



Source:
IDPH GIG

TABLES

TABLE 1. Chemicals of Interest in Soil and Sediment at Pfizer, Inc. (concentrations in parts per million)

| | Soil | | | | | | | | | Sediment | | Comparison Values | |
|------------------------|---------------------|-------------|------|--------|-------|--------|--------|--------------|--------|--------------|--------|-------------------|--------|
| | Off-site Background | On the site | | | | | | Off the site | | Off the site | | Value | Source |
| Sampling Point | X101 | X102 | X103 | X104 | X105 | X106 | X107 | X108 | X109 | X201 | X202 | | |
| SEMIVOLATILES | | | | | | | | | | | | | |
| Benz(a)anthracene | 0.071J | ND | ND | 0.23J | 1.2J | 0.360J | 0.970J | ND | 0.820J | ND | 4.300J | NV | NV |
| Chrysene | 0.099J | ND | ND | 0.30J | 1.3J | 0.380J | 1.000J | ND | 1.000J | ND | 4.500J | NV | NV |
| Benzo(b)fluoranthene | 0.150J | ND | ND | 0.26J | 1.7J | 0.540J | 1.300J | ND | 1.400J | ND | 4.400J | NV | NV |
| Benzo(k)fluoranthene | 0.048J | ND | ND | ND | 0.73J | 0.340J | 0.360J | ND | ND | ND | 2.200J | NV | NV |
| Benzo(a)pyrene | 0.071J | ND | ND | ND | 0.98J | 0.340J | 0.830J | ND | 0.760J | ND | 3.100J | 0.1 | CREG |
| Indeno(1,2,3-cd)pyrene | 0.061J | ND | ND | ND | 0.74J | 0.330J | 0.440J | ND | ND | ND | 1.700J | NV | NV |
| Benzo(g,h,i)perylene | 0.085J | ND | ND | ND | 0.53J | 0.320J | 0.370J | ND | ND | ND | 1.400J | NV | NV |
| INORGANICS | | | | | | | | | | | | | |
| Arsenic | 3.9 | 43.6 | 41.9 | 10.2 | 5.6 | 7.2 | 7.4 | 26.7 | 1.4 | 3.3 | 6.9 | 20 | CEMEG |
| Barium | 316 | 3040 | 2550 | 2580 | 3730 | 16400 | 6020 | 7900 | 9890 | 197 | 387 | 4000 | RMEG |
| Cadmium | 1.7 | 4.8 | 4.5 | 8.1 | 5.5 | 15.4 | 4.7 | 8.3 | 14.1 | 2.2 | 9.3 | 10 | CEMEG |
| Iron | 18200 | NT | NT | 199000 | NT | NT | 70200 | 303000 | NT | 18900 | 43900 | NV | NV |

NV - No comparison value listed for this chemical

ND - Not detected

NT - Not tested

J - Estimated Value

blank boxes indicate that the level of the chemical was less than the laboratory detection limit

CREG - Cancer Risk Evaluation Guideline (for children)

CEMEG - Chronic Environmental Media Evaluation Guideline (for children)

RMEG - Reference Dose Media Evaluation Guideline (for children)

TABLE 2. Inorganic Chemicals of Interest in Soils from Residential Yards and Vacant Lots near Pfizer, Inc. (concentrations in parts per million)

| | Concentration of Inorganic Compound in Soil | | | | Comparison Values | |
|---|---|---------|---------|-------|-------------------|--------|
| | Background | Range | | | Value | Source |
| Sampling Point | X101 | Minimum | Maximum | Mean | | |
| Illinois Department of Public Health Samples | | | | | | |
| Arsenic | 3.9 | 1.7 | 33.3 | 13.4 | 20 | CEMEG |
| Barium | 316 | 264 | 2160 | 718 | 4000 | RMEG |
| Cadmium | 1.7 | 1.5 | 8.5 | 4.2 | 10 | CEMEG |
| Iron | 18200 | 16830 | 67700 | 28574 | NV | NV |
| Integrity Engineering Samples | | | | | | |
| Barium | 316 | 129 | 858 | 349 | 4000 | RMEG |
| Iron | 18200 | 11900 | 25800 | 17090 | NV | NV |

NV - No comparison value listed for this chemical

CEMEG - Chronic Environmental Media Evaluation Guideline (for children)

RMEG - Reference Dose Media Evaluation Guideline (for children)

TABLE 3. Completed exposure pathways.

| Pathway Name | Source | Medium | Exposure Point | Exposure Route | Receptor Population | Time of Exposure | Exposure Activities | Estimated Number Exposed | Chemicals |
|-----------------------|---|--------------|--|-------------------------|--|---------------------------|---|--------------------------|--------------|
| On-site surface soil | Waste piles Site operations On-site soil | Surface soil | On-site soil | Ingestion Inhalation | Employees and visitors | Past Present Future | Contacting contaminated soil | 50 | Tables 1 & 2 |
| Off-site surface soil | Waste piles Site operations On-site soil Off-site soil | Surface soil | Yards Play-grounds | Ingestion Inhalation | Residents Playground users | Past Present Future | Playing in & working with contaminated soil | 800 | Tables 1 & 2 |
| Sediments | Contaminated Soil | Sediments | Children playing in Schoenberger Creek | Ingestion | Children ingesting sediments from Schoenberger Creek | Past Present Future | Playing in creek sediments | 30 | Tables 1 & 2 |
| Ambient Air | Waste piles Site operations Contaminated soil | Air | Residents closest to the site | Inhalation | Nearby residents | Past Present Future | Breathing | 1000 | Tables 1 & 2 |
| Waste Piles | Waste piles | Waste pile | Employees | Ingestion Inhalation | On-site Workers | Past Present Future | Working with the waste piles | 10 | Tables 1 & 2 |

TABLE 4. Potential exposure pathways.

| Pathway Name: | Source | Medium | Exposure Point | Exposure Route | Receptor Population | Time of Exposure | Exposure Activities | Estimated Potential Number Exposed | Chemicals |
|---------------|---------------------------------|--------------|-------------------------|----------------|--|---------------------------|----------------------------------|------------------------------------|--------------|
| Private Wells | Waste pile Contaminated soil | Ground-water | Residents near the site | Ingestion | Residents drinking contaminated well water | Past Present Future | Drinking contaminated well water | 75 | Tables 1 & 2 |

ATTACHMENT

ATTACHMENT 1

Comparison Values Used In Screening Contaminants For Further Evaluation

Environmental Media Evaluation Guides (EMEGs) are developed for chemicals based on their toxicity, frequency of occurrence at National Priority List (NPL) sites, and potential for human exposure. They are derived to protect the most sensitive populations and are not action levels, but rather comparison values. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Reference Dose Media Evaluation Guides (RMEGs) are another type of comparison value derived to protect the most sensitive populations. They do not consider carcinogenic effects, chemical interactions, multiple route exposure, or other media-specific routes of exposure, and are very conservative concentration values designed to protect sensitive members of the population.

Cancer Risk Evaluation Guides (CREGs) are estimated contaminant concentrations based on a probability of one excess cancer in a million persons exposed to a chemical over a lifetime. These are also very conservative values designed to protect sensitive members of the population.

Maximum Contaminant Levels (MCLs) have been established by USEPA for public water supplies to reduce the chances of adverse health effects from contaminated drinking water. These standards are well below levels for which health effects have been observed and take into account the financial feasibility of achieving specific contaminant levels. These are enforceable limits that public water supplies must meet.

Lifetime Health Advisories for drinking water (LTHAs) have been established by USEPA for drinking water and are the concentration of a chemical in drinking water that is not expected to cause any adverse non-carcinogenic effects over a lifetime of exposure. These are conservative values that incorporate a margin of safety.